

REMARKS

As a preliminary matter, claim 152 has been again canceled without prejudice, rendering any rejections thereto moot.

Claims 150-152 and 154-170 stand rejected under 35 U.S.C 103(a) as being unpatentable over Koma (U.S. 5,608,556) in view of Hirata et al. (U.S. 5,953,093). Applicants respectfully traverse this rejection because neither of the cited references, whether taken alone or in combination, discloses or suggests two different domain regulating means where both are either protrusions or slits, as featured in claim 150 of the present invention, as amended.

The Examiner acknowledges that Koma teaches only two domain regulating means within one pixel display area, but that only one is an X-shaped window, or slit, as asserted by the Examiner. The Examiner further acknowledges that Koma nowhere discloses nor suggests that protrusions can function as a domain regulating means. The Examiner cites only Hirata for teaching protrusions. Hirata, however, fails to teach or even suggest either protrusions or slits are used as domain regulating means.) ①

As previously discussed, Hirata is drawn to a twisted nematic ("TN") device, which devices orient the liquid crystal molecules horizontally to the substrates when no voltage is applied to the substrates. As such, the liquid crystal molecules have no pre-tilt, or domain regulating means for orienting the liquid crystal molecule azimuths when no voltage is applied.

Hirata discloses rubbing grooves into the substrate surface to create a series of rubbed peaks and valleys. Even if the Examiner could somehow equate these rubbed peaks and valleys with the specific protrusions and slits of the present invention, Hirata's peaks and valleys still would not teach or suggest the protrusions and slits of the present invention which serve as domain regulating means for regulating the orientation azimuths of the liquid crystal molecules.

Hirata teaches that its rubbed grooves only serve to provide pre-tilt to the liquid crystal molecules, and not to regulate their orientation azimuths. Pre-tilt, and the regulation of orientation azimuths, are not the same. In fact, Hirata specifically teaches that domain regulation is only performed by the rubbing process – the orientation direction being therefore the direction of the rubbing. Hirata teaches no other domain regulating means for regulating the orientation azimuths of the liquid crystal molecules. Moreover, with rubbing being the only domain regulating means, orientation of liquid crystal molecules is limited in Hirata to only two dimensions, that is, the direction of the rubbing process.

Most importantly, by requiring rubbing as its only means for regulating orientation of liquid crystal molecules, Hirata specifically teaches away from the present invention.

In contrast, claim 150 of the present invention as amended recites, among other things, first and second domain regulating means for regulating the orientation

azimuths of liquid crystal molecules, and that these first and second means are either protrusions or slits. Neither Koma nor Hirata teaches such a structure, alone or together.

Koma teaches only two domain regulating means. The first is an orientation control electrode, which is neither a slit nor a protrusion. The second is only one X-shaped slit, which is not equivalent to the slits of the present invention, nor those identified by the Examiner from Hirata. Koma's X-slits must necessarily terminate before reaching the edge of the pixel area. Otherwise, the pixel electrode would be severed, rendering it either half useless, or else functioning as two separate pixel electrodes.

Hirata teaches no domain regulating means other than the use of the rubbing process. Even if, for the purposes of this discussion only, Hirata's rubbed grooves were analogous to the protrusions and slits of the present invention, there is no teaching in Hirata that its rubbed grooves serve in any way to regulate the orientation azimuths of the liquid crystals. There is no suggestion in Hirata that the rubbed groove can perform any other function than enabling pre-tilt only. Such a function becomes superfluous in a vertical alignment ("VA") device, where the crystals are already vertical when no voltage is applied to the substrates. For at least these reasons, the Section 103 rejection based on a combination of Koma and Hirata is respectfully traversed.

Additionally, for a rejection based on obviousness, it is not enough to merely identify the specific elements of the present invention from a myriad of separate prior art references. The Examiner is also required to show, without the benefit of the

present application, where in the prior art there is some teaching or suggestion for the *combination* of the references themselves. The Examiner has to date not made such a required showing.

In fact, no such showing could be made in the present case. Hirata teaches only the rubbing method for regulating the orientation of liquid crystal molecules. Koma, on the other hand, specifically teaches away from the rubbing method. Two references which specifically teach away from each other cannot be properly used in combination in an obviousness rejection against the present invention. Applicants request the Examiner cite to where in the prior art there is any suggestion to combine Koma with Hirata to have Hirata's rubbed grooves perform as domain regulating means, or withdraw the rejection.

Furthermore, the Examiner asserts on page 3 of Paper No. 23 that Hirata shows in FIGS. 12 and 14 one domain regulating means substantially surrounding another. Applicants maintain that Hirata shows no such thing. Applicants further specifically request that the Examiner identify exactly which elements from Hirata are the first and second *domain regulating means*, and which one of the asserted two substantially surrounds the other within the meaning of the present invention, or withdraw the outstanding Section 103 rejection.

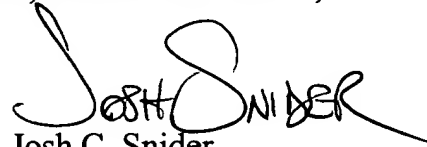
Attached hereto is a marked-up version of the changes made to the claims by the current amendment. The attached Appendix is captioned "**Version with Markings to Show Changes Made.**"

For all of the foregoing reasons, Applicants submit that this Application, including claims 150-151, and 154-170, is in condition for allowance, which is respectfully requested. The Examiner is invited and encouraged to contact the undersigned attorney if an interview would expedite prosecution.

Respectfully submitted,

GREER, BURNS & CRAIN, LTD.

By

A handwritten signature in black ink, appearing to read "Josh C. Snider". The signature is stylized with a large, looped "S" and "N".

Josh C. Snider

Registration No. 47,954

Customer No. 24978

December 30, 2002

300 S. Wacker Drive
Suite 2500
Chicago, Illinois 60606-6501
Telephone: (312) 360-0080
Facsimile: (312) 360-9315

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VERSION WITH MARKINGS TO SHOW CHANGES MADE**IN THE CLAIMS:**

Claim 150 has been amended as follows:

150. (Thrice Amended) A liquid crystal display device comprising:

a first substrate and a second substrate for sandwiching a liquid crystal having a negative dielectric constant anisotropy; and orientations of the liquid crystal being vertical to the first and second substrates when no voltage is applied; and

first and second domain regulating means for regulating azimuths of orientations of said liquid crystal when a voltage is applied to said liquid crystal,

wherein said first and second domain regulating means consist of protrusions provided on said substrates or slits provided at electrodes on said substrates,
and

wherein when vertically seen to the substrates, said first and second domain regulating means are arranged on said substrates so that said first domain regulating means substantially surrounds said second domain regulating means in athe display ~~area~~areas of eachthe pixel~~pixels~~; and

~~wherein said first and second domain regulating means consist of protrusions provided on said substrates or slits provided at electrodes on said substrates.~~